



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/526,916	03/07/2005	Yasuhiro Omori	JFE-05-1032	7535
35811 7590 08/12/2008 IP GROUP OF DLA PIPER US LLP ONE LIBERTY PLACE 1650 MARKET ST, SUITE 4900 PHILADELPHIA, PA 19103			EXAMINER YANG, JIE	
			ART UNIT 1793	PAPER NUMBER
			MAIL DATE 08/12/2008	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/526,916	Applicant(s) OMORI ET AL.	
	Examiner JIE YANG	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 June 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 23-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 23-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/18/2008 has been entered.

Status of the Claims

Claims 1-22 have been cancelled, claims 23-30 are added as new claims, and claims 23-30 are pending in application.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 1793

Claims 23-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ochi et al (US 6,602,358, thereafter US'358) in view of Ochi et al (US 6,660,105 B1, thereafter US'105) and Asano et al (US 7,083,688, thereafter US'688).

Element	From instant Claims (in wt%)	US'358 (in wt%)	Overlapping range (in wt%)
For claim 23		See claims 1, 3	
C	0.35-0.7	0.45-0.59	0.45-0.59
Si	0.30-1.1	0.15 –0.4	0.4-0.4
Mn	0.20-2.0	0.15-0.45	0.2-0.45
Al	0.005-0.25	0.015-0.05	0.015-0.05
Ti	0.005-0.1	0.015 –0.03	0.015 –0.03
Mo	0.05-0.6	0.1-0.35	0.1-0.35
B	0.0003-0.006	0.0005-0.005	0.0005-0.005
S	0.06 or less	0.005-0.15	0.005-0.06
P	0.02 or less	0.02 or less	0.02 or less
Cr	0.2 or less	0.1 or less	0.1 or less
Fe	Balance	Balance	Balance
For claim 24		US'105 See Cl.1,5,8	
Cu	1.0 or less	--	--
Ni	3.5 or less	0.1-3.5	0.1-3.5
Co	1.0 or less	--	--
Nb	0.1 or less	0.022-0.04	0.022-0.04
V	0.5 or less	0.03-0.5	0.03-0.5

Regarding claim 23, US'358 teaches a process for producing a steel constant velocity joint (Abstract, Col.1, lines 8-11 of US'358) by applying an induction hardening treatment (Col.2, Line 23-42 US'358). US'358 teaches providing a hot worked steel (Abstract, Col.1, line 66 to Col.2, line 47 of US'358). The composition comparison between instant claim 23 and US'358's steel is listed in above table. All the compositions disclosed by US'358 overlap the compositions of the instant claim 23,

Art Unit: 1793

which is a prima facie case of obviousness. SEE MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art to select C, Si, Mn, Al, Ti, Mo, B, S, P, Cr, and Fe from the induction hardening steel composition disclosed by '358 because '358 discloses the same utility throughout the disclosed ranges. US'358 teaches hot working, cooling, and induction hardening steps (Col.2, lines 23-42 of US'358) as recited in the instant claim. US'358 does not specify the cooling rate at least 0.2°C/s and the structure of bainite and/or martensite with total volume fraction being 10% or more. US'105 teaches a case hardening steel having good grain coarsening properties during carburization with a composition overlapping the major composition range of alloy recited in instant claim (claim 1, 5 and 8 of US'105). US'105 teaches: "after rolling, the steel was cooling from 800 °C to 500 °C at a rate of 0.2 to 1.5 °C/s" (Col.12, Line 52-67 of US'105), which is within the claimed cooling rate as recited in the instant claim. US'105 further teaches in example 4, over 10% (10-20%) bainite fraction after rolling had been obtained (Table 5 of US'105), which is within the claimed fraction of bainite and martensite range as recited in the instant claim. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to choose proper cooling rate in order to obtain desired

Art Unit: 1793

microstructure as demonstrated by US'105 in the process of US'358. US'358 teaches that the induction hardening depth can reach to 4.6 to 5.7 mm and Austenite grain size number not less than 8 (JIS), which reads on the 2 mm or more induction hardening layer and 12 μ m or less prior austenite grain size as recited in the instant claim 23.

Regarding the limitation of the temperature of the final induction hardening is 800 to 950°C (claims 23, 25, and 26) and all the temperature of the induction hardening is 800 to 1000°C (claims 25 and 26), US'105 teaches hardening after hot rolling at 930-950°C (example 1 and table 2 of US'105); Quench-hardened at 900°C by reheating (example 5, and table 8 of US'105). The temperature of the induction hardening process is recognized as a result-effective variable in term of hardening result as evidenced by US'688. US'688 teaches a process of producing a high strength race which has superior rolling and fatigue properties and high anti-surface fatigue strength (Abstract, Col.1, lines 7-10 of US'688). US'688 teaches induction hardening a steel with major composition range overlapping with the composition range as recited in the instant invention (Abstract, claims 1 and 3 of US'688). US'688 teaches the surface temperature of the test part could be raised by high-frequency

Art Unit: 1793

heating in 0.9 second to 850°C and raised to 1150°C by adding 1.9 seconds more (Col.4, lines 47 to 52 of US'688). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select proper temperature for induction hardening as demonstrated by US'688 in the process of US'358 in view of US'105 in order to obtain the desired surface hardness (Col.4, lines 11-14 of US'688). MPEP 2144.05 II.

Regarding claim 24, US'358 does not specify wherein at least one element from group of Cu, Ni, Co, Nb and V is added in the alloy. US'105 teaches adding 0.1-3.5wt% Ni, 0.022-0.04 wt% Nb, and 0.03-0.5wt% V in hot rolled case hardening steel (Claims 1, 5, and 8 of US'105). These composition ranges overlap that claimed composition ranges in the instant claim. US'105 teaches: "Ni is another element that is effective for imparting strength and hardenability to the steel..." (Col.7, Line 19-24 of US'105); Nb could refine the grains, and it is also effective for suppressing grain coarsening (Col.6, lines 1444 of US'105); and "V is another element that is effective for imparting strength and hardenability to the steel..." (Col.7, Line 25-32 of US'105). Therefore, it would have been obvious to one of ordinary skill in the art to choose suitable amount of at least one from group of Cu, Ni, Co, Nb and V as demonstrated in US'105 in the process of

Art Unit: 1793

US'358 in view of US'688 in order to impacting strength and hardenability to the steel as taught by US'105.

Regarding claims 27-30, US'835 in view of US'105 does not specify the heating time of the final hardening is 5 seconds or less (claims 27-30). the induction hardening process is recognized as result-effective variable in term of hardening result, which is evidenced by US'688. US'688 teaches the surface temperature of the test part could be raised by high-frequency heating in 0.9 second to 850°C and raised to 1150°C by adding 1.9 seconds more (Col.4, lines 47 to 52 of US'688). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the heating time for induction hardening, for example less than 5 seconds as demonstrated by US'688 in the process of US'358 in view of US'105 in order to obtain the desired surface hardness (Col.4, lines 11-14 of US'688). MPEP 2144.05 II.

Response to Arguments

Applicant's arguments filed on 6/18/2008 with respect to claims 20-23 have been fully considered but they are not persuasive because they are directed to the amended features and the examiner's position regarding the amended features was stated above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jie Yang whose telephone number is 571-2701884.

The examiner can normally be reached on IFP.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-2721244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JY
/Roy King/
Supervisory Patent Examiner, Art Unit 1793